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IMPACT OF GDP VOLATILITY ON CURRENT ACCOUNT BALANCES

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Impact of GDP volatility on current account balances

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Abstract

This paper empirically investigates the impact of GDP volatility on current account balances for a large sample of developed and developing countries. We extend the standard set of short- and long-term determinants of current accounts to include GDP volatility computed from the annual growth rate of GDP. It turns out that for low income countries the impact of GDP volatility on their current account balances is negative, whereas the reverse is true for high income countries. The intertemporal approach to the balance of payments followed in this paper suggests that a diverse response of current account balances to GDP volatility can be due to the different degree of shock persistence in developed and developing countries.

Keywords:

current account, savings, investment, volatility

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1. Introduction

Prolonged current account deficits are a major concern to international macroeconomists. It is an important indicator of an economy's performance, playing several roles in policy makers' analyses of economic developments. First, it is significant because the current account balance (CA), reflecting the savings–investment differential, is closely related to the status of the fiscal balance and private savings, which are key factors of economic growth. Second, a country's balance on its current account is the difference between exports and imports, reflecting the totality of domestic residents' transactions with foreigners in the markets for goods and services. Third, because the current account balance determines the evolution over time of a country's stock of net claims on (or liabilities to) the rest of the world, i.e. it reflects the inter-temporal decisions of (domestic and foreign) residents. Fourth, prolonged current account deficits and deteriorating fiscal position of a nation may lead to sudden stops or reversals of capital flows that may enforce a process of harsh readjustments upon an affected economy, frequently accompanied by severe recessions.

Consequently, policy makers endeavour to explain CA movements, assess the balance's sustainability, and induce changes through policy measures (Isard and Faruquee, 1998). In particular, the notion of current account sustainability has come to be of considerable interest in the context of recent episodes of macroeconomic turbulence in many emerging markets. This paper does not directly address the question of current account sustainability. However, the analysis does provide an indication of the levels of current accounts that may be considered 'normal' for a country, based on some standard macroeconomic attributes such as stage of development, demographic profile, volatility etc.

There are several researches in the subject of current accounts. This paper is related to a number of different strands of literature. One approach, represented by papers such as Ghosh (1995) and Ghosh and Ostry (1995), is the application of insights derived from the consumption-smoothing literature to the modeling of current account dynamics. Glick and Rogoff (1995) and Nason and Rogers (2002) model the joint dynamics of investment and current accounts in response to productivity shocks. These papers, however, focus largely on the short-run dynamics of the current account. The more ambitious inter-temporal approach to current account determination, as typified by the work of Razin (1995) and Obstfeld and Rogoff (1996), has attempted to extend dynamic optimizing models to the open economy context. An

alternative approach to empirically investigate the determinants of current account is adopted by Schmidt-Hebbel et al. (1992), Edwards (1995), Debelle and Faruquee (1996), Masson et al. (1998), Taylor (2002), Chinn and Prasad (2003), Aristovnik (2008), Herrmann and Winkler (2009). They use a saving-investment perspective for both industrial and developing countries. Most of these papers have attempted to link national and private saving to structural determinants including levels of economic development, demographic profiles etc. When Serven (1998) examines the macroeconomic determinants of investment in developing countries, Herwartz and Siedenburg (2007) employ panel data as well as country-specific models to uncover empirically the determinants of current account imbalances in 16 OECD countries. Sun (2010) uses a new factor, economic structural changes, to explain the differences of private savings in developing countries and its impacts on current account balance.

We build upon the work of the authors cited above and, in particular, generalize the work of Debelle and Faruquee (1996), Calderon et al. (1999), and Chinn and Prasad (2003) by extending the analysis to include novel independent variables to explore the impact of GDP volatility on CA for low and high income countries. Although we use a variety of theoretical models to understand and interpret our results, we do not test any of these models or their predictions formally. Our work is similar in some respects to that of Calderon et al. (1999), and Chinn and Prasad (2003). However, our focus, unlike theirs, is to empirically investigate the impact of short- and long-term determinants, especially the impact of GDP volatility, on CA for a large sample of developed and developing countries. Chinn and Prasad (2003) have not taken into consideration the variations in CA that are driven by cyclical influences and shocks. We have attempted to capture this by adding a novel determinant ‘volat’ (i.e., GDP volatility which is the standard deviation of the annual growth rate of GDP). We notice that when ‘stock market capitalisation’, which is available mostly for high income countries, is dropped from the model, the coefficient sign of ‘volat’ turns out to be negative and insignificant in long-term. This result motivates us to empirically investigate and prove in this paper that when countries’ income is low the impact of GDP volatility on their current account balances is negative. To test the sensitivity of our results for short- and long-term, we examine the determinants of current account fluctuations at different frequencies (using annual data and 5-year averaged data respectively) to see if they provide a reasonably consistent story.

The remainder of this paper is organised as follows: Section 2 discusses some theoretical issues useful to the empirical modeling of current account dynamics. Section 3 sketches the

dataset and empirical framework. Panel regression results are presented in Section 4. The last section summarises our main findings and concludes.

2. Theoretical issues

It is very difficult to capture the entire range of empirical relationships on CA. Nevertheless an attempt has been made in this sub-section to discuss the rationale of a few of those theoretical and empirical relationships pertaining to CA in order to outline a layout for model specification.

2.1 Existing literature

The ‘stages of development’ hypothesis for the balance of payments suggests that as countries move from a low to a high stage of development, try to import capital and, hence, run current account deficits (Roldos, 1996). As they reach an advanced stage of development, countries run current account surpluses in order to pay off accumulated external liabilities and also to export capital to less advanced economies. Using a cross-section of countries distributed over a wide range in terms of stages of development provides an indirect test of the empirical validity of this hypothesis.

Chinn and Prasad (2003) and Aristovnik (2008) have empirically shown a positive association between the ‘relative income’ and the current account balance. The rationale is that less-developed countries are assumed to grow faster than the average rate, and are thus borrowing against future income, consistent with the hypothesis of the stages of development.

The assessment of the relevance of a demographic factor such as the ratio of the number of old people (older than sixty-five) as percentage of working-age population shows negative and statistically significant influence on CA (Chinn and Prasad 2003; Aristovnik 2008). A negative relation between these variables is closely related to the life-cycle hypothesis, by which older populations save less. Such results are also similar to the results of Bussiere et al. (2004), Zanghieri (2004), and Herrmann and Jochem (2005). From the perspective of current account determination, such a demographic profile should be important only insofar as they differ across countries and, thereby, influence cross-country differences in saving. There could also be differences in saving patterns of old dependents. We use ‘old dependency ratio’ in our empirical work to assess the relevance of this demographic factor on CA.

‘Average GDP growth’ has a negative effect on CA, implying that the current year

domestic growth rate is associated with a larger increase in domestic investment than savings (Calderon et al. 2002; Chinn and Prasad 2003; Gandolfo 2004; Zanghieri 2004; Aristovnik 2008). The rationale is that an increase in current period domestic economic growth accelerates demand for foreign goods and services and consequently deteriorates the current account balance. On the basis of the above rationale, a rise in the growth rate of average GDP is associated with a greater savings rate than the investment rate, which might lead to a surplus in the current account balance. We know that net exports are a component of aggregate demand. We would face reverse causation problem if we used current GDP growth because current value of CA affects current GDP growth. Hence, instead of ‘average GDP growth’ we have used ‘lagged GDP growth’ as an independent variable.

‘Terms of trade volatility’ is another potential determinant of fluctuations in current accounts. Agents in economies that face more volatile terms of trade might save more for precautionary reasons in order to smooth their consumption streams in the face of volatile income flows. Countries with more volatile terms of trade may also be less attractive for international capital. However, Aizenman (1994) and others have argued that multinationals tend to diversify their production base across countries with volatile terms of trade in order to have the flexibility to exploit terms of trade movements that are favorable to them.

The degree of financial development has been cited to explain why capital is not flowing from developed to developing countries and the patterns of international capital flows drive CA imbalances. Asset riskiness is reduced in mature financial markets and translates into lower interest rates thereby stimulating investment and discouraging savings. However the responsiveness of investment to the cost and availability of credit differs between countries as documented by Gruber and Kamin (2009). From theoretical perspective the degree of financial development has thus ambiguous impact on CA what gives importance to empirical test of this relation. We include the ‘stock market capitalisation’ as a proxy for the degree of financial development.

2.2 The impact of output volatility on CA

There is hardly any study exploring the impact of GDP volatility (volat), measured from the annual growth rate of GDP, on CA. We conjecture that the influence of output volatility on saving behaviour and thereby on CA is conditional on the level of income, i.e. distinct for high income and low income countries. To demonstrate the diverse role played by GDP volatility in

shaping the saving behaviour we resort to the intertemporal approach to the balance of payments and distinguish between permanent and transitory income shocks¹.

Let's consider a small endowment economy with the representative consumer seeking to maximise his lifetime utility which depends on consumption in period 1 and 2. The utility function is assumed to be time-separable and is specified as

$$U = \ln c_1 + \beta \ln c_2 \quad (1)$$

where c_1 and c_2 stand for consumption in period 1 and 2, respectively, and β is the subjective discount factor.

The maximization of Equation (1) is subject to the intertemporal budget constraint:

$$c_1 + \frac{c_2}{1+r} = y_1 + \frac{y_2}{1+r} \quad (2)$$

where y_1 and y_2 denote resources available in periods 1 and 2, respectively and r is the real interest rate assumed invariant across periods.

The intertemporal Euler equation for this problem takes the following form:

$$c_2 = c_1(1+r)\beta \quad (3)$$

In the special case when the subjective discount rate equals the market interest rate, the Euler equation boils down to

$$c_2 = c_1 \quad (4)$$

reflecting the desire of consumer's to smooth consumption over time. A rational consumer splits the present discounted value of the sum of his lifetime resources evenly between every period. Consumption thus depends on permanent income, y^p , which we define so that

$$y^p \frac{2+r}{1+r} = y_1 + \frac{y_2}{1+r}. \quad (5)$$

Combining the intertemporal budget constraint (2) with Euler equation (4) and using (5) yields the optimal consumption profile

$$c_1 = c_2 = y^p. \quad (6)$$

Consumers in low-income countries regard the current level of their income as falling short of the weighted average of future incomes and they plan to borrow in the international financial markets. In terms of Equation (6) $y^p > y_1$ and, therefore, $c_1 > y_1$ which translates into current account deficit. If the inherited stock of foreign assets in period 1 is equal to zero, current

¹ See e.g. Obstfeld and Rogoff (1996).

account is the level of income less domestic absorption consisting of consumption:

$$CA_1 = y_1 - y^p < 0, \quad (7)$$

Next we consider a permanent endowment shock. Suppose that people expect income in both periods to increase by an amount x . The new level of permanent income has to be redefined in the following manner

$$y^{pp} \frac{2+r}{1+r} = y_1 + x + \frac{y_2 + x}{1+r} = (y^p + x) \frac{2+r}{1+r}. \quad (8)$$

where the second ‘ p ’ accompanying the symbol for permanent income reflects the permanent nature of the income shock.

It can be easily shown that the optimal level of consumption is then given by

$$c_1 = c_2 = y^{pp} = y^p + x. \quad (9)$$

In other words, consumers adjust to a permanent income shock by raising their spending in both periods. Little consequences on the current account would therefore arise, since the increase in consumption is equal to the boost in income.

By contrast, a temporary positive income shock is smoothed out by lending abroad rather than adjusting consumption. Suppose that the economy benefits from a rise in endowment by x only in the first period. The transitory change in income allows to rewrite the definition of permanent income, y^{pt} as follows

$$y^{pt} \frac{2+r}{1+r} = y_1 + x + \frac{y_2}{1+r} = \frac{2+r}{1+r} y^p + x, \quad (10)$$

and to compute the optimal level of consumption

$$c_1 = c_2 = y^{pt} = y^p + x \frac{1+r}{2+r}. \quad (11)$$

It stems from Equation (11) and (9) that consumption is lower than it would be in case of a permanent income shock. Moreover an inspection of Equation (11) reveals that a positive transient income shock unambiguously leads to a current account improvement. In fact the rise in consumption falls short of x , an amount by which income grows.

In summary, economies tend to finance temporary income shocks by borrowing or lending abroad and adjust consumption in response to permanent shock. Thus permanent shocks exert weak influence on the current account. In light of the intertemporal approach to the balance of payments differences in the response of current accounts to output volatility are

attributable to the degree of shock persistence.

Two groups of countries distinct with respect to nature of shock have been identified on empirical grounds. Aguiar and Gopinath (2007), using data for 26 developed and developing economies, showed that shocks to trend growth are the primary source of fluctuation in emerging market countries. Conversely, developed markets are characterized by a relatively stable trend and business fluctuations are mostly transitory. As a result, a shock to GDP growth should stimulate consumption more in developing than in high income countries, leaving current account largely unaffected in the former group while improving it in the latter. Hence, the impact of GDP growth volatility on current accounts is conditional on the level of income. We try to verify this hypothesis in the next section.

3. Data and empirical framework

We have used a large sample of 175 countries, developed as well as developing, for our analysis. The basic data set is annual data, which covers the period from 1981 to 2009 with data going back to 1960s and 1970s for some countries in the regression analysis based on 5 year averages. The variables used for our empirical framework are as follows:

- $gdppcusdrel$ = Relative per capita income ('GDP per capita in constant 2000 USD for each countries' \div (divided by) 'GDP per capita in constant 2000 USD in the USA'),
- $gdppcusdrelsq$ = Relative per capita income squared,
- $olddepend$ = Old dependency ratio: relative to mean across all countries ('Population over the age 65 years' \div (divided by) 'Population between the age 15 and 65 years'),
- $L.gdpgr$ = Lagged GDP growth in annual percentage (one period lag),
- $totvol$ = Terms of trade volatility (Standard deviation of net barter terms of trade index: 2000=100),
- $volat$ = GDP volatility (Standard deviation of the annual growth rate of GDP),
- $marketcap$ = Stock market capitalisation of listed companies as percentage of GDP,
- $volatdum$ = ' $volat$ ' \times (multiplied by) 'dummy' (where 'dummy' = 1 if $gdppcusd > 6364.964$ and 'dummy' = -1 if $gdppcusd < 6364.964$).

The dependent variable in our analysis is the current account balances (CA), expressed as Current Account to GDP ratio. A negative value of the dependent variable represents a current account deficit. The data source for all the above variables is the World Development Indicators.

In our panel regressions, we have used annual data to explore the short-term impact of independent variables on CA. Many cross-country panel studies use fixed effects (FE) in order to soak up all country-specific effects. We share with Chinn and Prasad (2003) the view that, for understanding cross-country variation in current accounts, fixed effects would detract from much of the economically meaningful parts of the analysis. Besides, a substantial percent of the sample variation of the current account to GDP ratio is attributable to cross-section rather than time-series. Thus, as a robustness check, we estimate FE with fixed country (i.e., cross-section fixed) and no time variation (i.e., period none) for annual data. However, one potential problem with developing country data is the possibility of significant measurement error in annual data. To avoid these concerns, we construct a panel that contains non-overlapping 5-year averages of the annual data for each country. Then we estimate ordinary least squares (OLS) specification on the basis of non-overlapping 5-year averages data with control for heteroscedasticity to obtain the robust standard errors and also to investigate the long-term determinants of CA. Following the previous theoretical and empirical studies of DeBelle and Faruquee (1996), Calderon et al. (2002), Chinn and Prasad (2003), and Zanghieri (2004), we estimate a model with two new independent variables such as ‘volat’ and ‘volatdum’ that can be expressed in the following general form:

$$CA_{it} = \alpha_i + \beta X_{it} + \lambda_t + \varepsilon_{it}. \quad (12)$$

where the dependent variable is current account balances (CA) for the i^{th} country at time t , and the vector of independent variables (X_i) includes *gdppcusdrel* (Relative per capita income), *gdppcusdreelsq* (Relative per capita income squared), *olddepend* (Old dependency ratio), *L.gdpgr* (Lagged GDP growth in annual percentage), *totvol* (Terms of trade volatility), *volat* (GDP volatility), *marketcap* (Stock market capitalisation of listed companies as percentage of GDP), and *volatdum* (product of ‘volat’ and ‘dummy’). The vector β is the vector of coefficients of independent variables, λ denotes the coefficient of time dummies, and ε_{it} captures the residual errors. The term α_i represents the effects of those variables particular to the i^{th} individual country in more or less the same fashion over time.

4. Panel regression results

We first examine the results of fixed effects (FE) specification with time effects for annual data to explore the short-term determinants of current account balances, which is reported in Table 1.

Table 1
Panel regressions, fixed effects specification with time effects
(Dependent variable: Current Account to GDP ratio)

VARIABLES	(1)	(2)	(3)	(4)
gdppcusdrel	12.46 (10.791)	41.46*** (13.606)	12.85 (10.769)	9.35 (10.923)
gdppcusdrelsq	-5.34 (8.217)	-28.13*** (8.829)	-6.07 (8.203)	-3.79 (8.287)
olddepend	-0.33*** (0.119)	-0.62*** (0.129)	-0.37*** (0.119)	-0.36*** (0.119)
L.gdpgr	-0.07*** (0.030)	-0.10*** (0.040)	-0.06** (0.030)	-0.06** (0.030)
totvol	0.04*** (0.017)	0.13*** (0.024)	0.04*** (0.017)	0.04*** (0.017)
volat		0.55*** (0.092)	0.21*** (0.062)	0.36*** (0.099)
marketcap		-0.006 (0.004)		
volatdum				0.17** (0.091)
Observations	2737	1402	2737	2737
R-squared	0.576	0.661	0.578	0.578

Notes: Standard errors are reported in parentheses; *** p<0.01, ** p<0.05; period dummies included. The dependent and independent variables are annual data.

This table shows the results for all countries. A result with respect to sign of coefficients that appears to be relatively consistent with literature is that in all model specifications shown in columns (1) - (4), relative per capita income and terms of trade volatility are positively related, and relative per capita income squared, old dependency ratio and lagged GDP growth are negatively related to the current account balances. However, such relationships are not significant for all models.

When we include ‘volat’ and ‘marketcap’ as independent variables in the model, shown

in column 2, the coefficient of 'volat' is positive and significant. When the 'stock market capitalisation' is dropped from the model the coefficient sign of 'volat' is positive but the value of the coefficient is largely reduced. We empirically observe that the impact of 'volat' along with 'stock market capitalisation', which is available mostly for high income countries, on CA is positive and significant and it becomes much less pronounced when the variable 'marketcap' is dropped. It suggests that for low income countries the impact of GDP volatility on CA is negative. The rationale for such suggestion is as follows.

Since data for 'stock market capitalisation' is mostly available for high income countries, we experimented with several threshold value of GDP per capita in constant USD (gdppcusd) for which the coefficient of variable 'volat' switches from positive to negative. In fact we test 50th, 55th, 60th percentile and so on, up to 85th percentile of 'gdppcusd'. We have empirically found the most robust result for the 75th percentile of 'gdppcusd' for 5-year averages, i.e. 6364.964. To be more precise, if GDP (i.e., gdppcusd) of a country is greater than 6364.964 the impact of volatility on CA is positive and it is negative if 'gdppcusd' is smaller than 6364.964. We construct a dummy variable which take value 1 if $gdppcusd > 6364.964$ and -1 (minus 1) if $gdppcusd < 6364.964$. Then we create an interaction term equal to the product of the aforementioned dummy and volatility, we call it 'volatdum'.

When we include 'volatdum' instead of 'marketcap' in the set of independent variables, the coefficient sign turns positive as reported in column (4) of Table 1. To assess the overall impact of GDP volatility on CA one has to add the values of coefficients accompanying 'volat' and 'volatdum'. It stems from Table 1 that in countries with income above the threshold of 75th percentile an increase in volatility leads to a CA improvement larger by a factor of 2.8 than in the remaining countries.

The insignificant relationship between independent and dependent variables in most of the models, and unexpected coefficient signs in short-run might be due to the possibility of significant measurement error in annual data pertaining to developing countries. Thus, we try to avoid this problem by constructing a panel data that contains non-overlapping 5-year averages of the annual data for each country. Then we estimate ordinary least squares (OLS) specification results on the basis of non-overlapping 5-year averages data with control for heteroscedasticity to obtain the robust standard errors, which are reported in Table 2. These results can be considered as the long-term determinants of current account balances.

Table 2
Panel regressions, OLS specification with time effects
(Dependent variable: Current Account to GDP ratio)

VARIABLES	(1)	(2)	(3)	(4)
gdppcusdrel	44.70*** (6.777)	23.57*** (6.482)	44.88*** (6.771)	35.00*** (7.010)
gdppcusdrelsq	-26.62*** (5.340)	-10.83** (4.824)	-26.82*** (5.329)	-20.38*** (5.512)
olddepend	-0.643*** (0.119)	-0.449*** (0.115)	-0.649*** (0.119)	-0.606*** (0.113)
L.gdpgr	0.160 (0.133)	0.324** (0.152)	0.160 (0.134)	0.151 (0.131)
totvol	0.0814* (0.0443)	0.154** (0.0656)	0.0844* (0.0458)	0.0877* (0.0460)
volat		0.399** (0.184)	-0.0875 (0.191)	0.301 (0.251)
marketcap		0.0133* (0.00740)		
volatdum				0.563** (0.230)
Observations	603	334	603	603
R-squared	0.297	0.289	0.297	0.313

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; period dummies included. The dependent and independent variables are non-overlapping 5-year averages.

Table 2 shows results from panel OLS regressions for all countries. An important consideration in understanding current account dynamics is the role of international capital flows. Especially for developing countries, the ability to run current account deficits could well be affected by industrial countries' willingness to finance those deficits through capital flows. These patterns of capital flows could be influenced by a number of factors including macroeconomic conditions in industrial countries and have indeed fluctuated significantly over time (Bosworth and Collins, 1999). We address this issue in our estimation by including time dummies for each 5-year period in our regressions. These time dummies were jointly significant in all of the regressions results shown in Table 2.

In columns (1) – (4) of Table 2, the coefficients on the relative per capita income terms are positive and significant. This suggests a positive association between the relative per capita income (gdppcusdrel) and the current account balances (CA), i.e. per capita income of below

the average lowers the current account balances. The rationale is that less-developed countries are assumed to grow faster than the average rate, and are thus borrowing against future income, consistent with the hypothesis of the stages of development. This result is similar to the findings of DeBelle and Faruquee (1996), Calderon et al. (2002), Chinn and Prasad (2003), Herrmann and Jochem (2005), Zanghieri (2004), and Aristovnik (2008).

The squared term of the relative per capita income allows for possible nonlinearities in the relationship between relative per capita income and current account balances. This term captures the empirical relevance of the stages of development hypothesis that predicts a U-shaped relationship between the current account balances and the stage of development, as measured by relative per capita income. The positive and significant coefficients of relative per capita income, and the negative and significant coefficients of its squared term in all models, columns (1) – (4) of Table 2, suggest an opposite pattern to that of the stages of development hypothesis. This pattern, however, appears to be driven mainly by the industrial countries (Chinn and Prasad, 2003).

The assessment of the relevance of a demographic factor, i.e. the ratio of the number of people older than sixty-five over total working age population between the age group of 15-65 years (*olddepend*), shows negative and statistically significant results for all models (columns (1) – (4) of Table 2) of OLS estimation. A negative relation between the variables is closely related to the life-cycle hypothesis, by which younger (less than 15 years of age) and older populations (more than 65 years of age) save less. Partial confirmation of the effect of a demographic factor on external imbalance probably reflects its negative influence on private and public domestic savings, which confirm the validity of the twin deficit hypothesis in the region (Loayza et al., 2000). Such results are also similar to the results of Chinn and Prasad (2003), Bussiere et al. (2004), Zanghieri (2004), Herrmann and Jochem (2005), and Aristovnik (2008).

It has been observed that the relationship between lagged GDP growth and current account balances is not significant, except for model 2 shown in column (2) of Table 2. However, these two variables show a positive relationship over the period. This is mainly because of a strong positive relationship between average output growth and current account balances for the industrial countries, which is consistent with the observation that advanced countries that had relatively high growth rates over the last five years have generally been net providers of capital to other economies (Chinn and Prasad, 2003).

We find a positive and statistically significant relationship between the terms of trade volatility (totvol) and current account balances (CA), i.e. higher 'totvol' is associated with larger 'CA'. This result is consistent with the notion of this volatility inducing more precautionary savings and/or lower investment, and also somewhat consistent with the Harberger–Laursen–Metzler effect.² Nevertheless, the decline in savings is not solely a result of adverse transitory terms of trade shocks, but also a consequence of the poor economic state of these countries, especially in the first half of the 1990s. Debelle and Faruquee (1996) and Calderon et al. (2002) find similar results.

We have investigated the impact of GDP volatility (volat) on CA for high income and low income countries. Column (2) of Table 2 shows that the impact of 'volat' along with 'stock market capitalisation', which is available mostly for high income countries, on CA is positive and significant. However, when the 'stock market capitalisation' is dropped from the model, the coefficient sign of 'volat' turns out to be negative and insignificant (column (3) of Table 2). Further, when include 'volatdum' instead of 'stock market capitalisation' in a set of independent variables, the coefficient sign of 'volat' turns positive but insignificant. Conversely the coefficient on 'volatdum' is negative and statistically significant. This result further corroborates the idea that for low income countries the impact of GDP volatility on CA is negative. Such empirical result is not surprising as output fluctuations are more persistent in these countries and lead to a more robust response of consumption to output growth than is observed in developed countries. Consequently volatility of consumption exceeds GDP volatility and thereby a positive shock to the rate of economic growth results in a deterioration of the current account.

5. Concluding remarks

The objective of this paper was to investigate the short- and long-term empirical relationships between current account balances and GDP volatility along with a broad set of determinants of CA. We found that relative per capita income, terms of trade volatility are positively related, and relative per capita income squared, old dependency ratio are negatively related to the current account balances for short- and long-term. However, we observed some differences with respect to the significance of coefficients in short- and long-term. Further, we noticed that lagged GDP growth is negatively and significantly associated with current account

² The Harberger–Laursen–Metzler effect predicts that positive transitory terms-of trade shocks produce an improvement in current income that is greater than that in permanent income. Accordingly, an increase in savings

balances in short-term, but the opposite is true in long-term. These results are generally consistent with theoretical and empirical analyses.

Moreover, when we include 'volat' and 'marketcap' as independent variables in the model, we found that the coefficient of 'volat' is positive and significant both in short- and long-term. However, when the 'stock market capitalisation' is dropped from the model, the coefficient sign of 'volat' turns out to be negative and insignificant in long-term. After inclusion of 'volatdum' instead of 'stock market capitalisation' in a set of independent variables, the coefficient sign of 'volat' becomes positive but insignificant in long-term. This behaviour of GDP volatility suggests that for low income countries the impact of GDP volatility on current account balances is negative. Higher GDP volatility has more adverse impact on investment as compared to its positive impact on domestic savings in a low income economy. One important policy implication of our findings is that if a low income economy (GDP per capita of less than 6364.964) wants to reduce current account deficits, it has to reduce the GDP volatility and stabilise its economy.

Whatever facts presented in this paper have left some questions open for future work. For instance, from an inter-temporal perspective, a better understanding of the dynamic effects on the current account of shocks with different degrees of persistence could have important theoretical as well as policy implications. To check the robustness of OLS specification, one could try cointegration and vector error correction model (VECM) to explore the long-term determinants of current account balances. Another important challenge is to identify the channels through which different shocks affect the current account. Do the effects propagate via the trade balance or other components of the current account? Hence, the empirical regularities documented in this paper point to some interesting directions for further work towards understanding the factors that ultimately determine sustainable current account balances in the long-term.

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